

Determining Intercepts

by Sophia

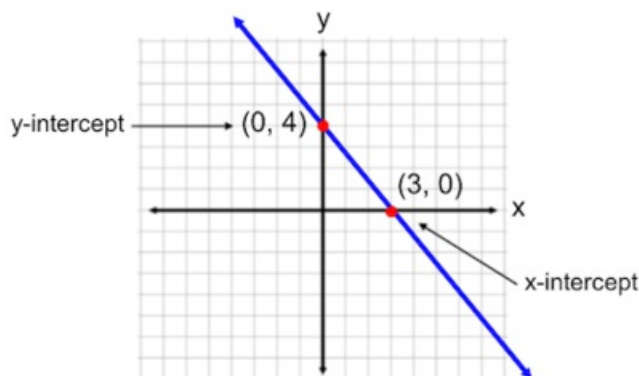


WHAT'S COVERED

In this lesson, you will learn how to determine the x-intercept and y-intercept of a linear equation. Specifically, this lesson will cover:

1. Determining Intercepts on a Graph

When we talk about a line's intercepts, we most often mean the **x-intercept** and the **y-intercept**. These are locations where the line intercepts or crosses the x- or y- axis. A Below is the graph of a line, with both intercepts shown:



BIG IDEA

Notice that the x-intercept always has a y-coordinate of 0, and the y-intercept always has an x-coordinate of 0.



TERMS TO KNOW

x-intercept

Where a line or curve intersects the x-axis, at $y = 0$.

y-intercept

Where a line or curve intersects the y-axis, at $x = 0$.

2. Determining Intercepts from a Table

Keeping the above note in mind, we can easily identify intercepts from a table of x and y values when we notice that one of the coordinates is zero!

➔ **EXAMPLE** Find the x -intercept and y -intercept for the list of values in the following table.

x	y
-2	18
0	12
2	6
4	0
6	-6

We see that a coordinate pair (0, 12) contains a zero. In this coordinate pair, the x -coordinate is zero, which means this actually represents the y -intercept. The y -intercept of the line is at the point (0, 12).

We also notice a zero in the coordinate pair (4, 0). In this case, the y -coordinate is zero, so this is the x -intercept. The line crosses the x -axis at the point (4, 0).

3. Determining Intercepts from an Equation

How can we use the equation of a line to find its x - and y - intercepts? A common form of a line is in slope-intercept form: $y = mx + b$. This form is called slope-intercept form because b represents the y -coordinate of the y -intercept (and we know that its x -coordinate is 0). We can also use the equation in this form to find the x -intercept. Since x -intercepts have a y -coordinate of 0, we set the equation equal to zero and solve for x .

➔ **EXAMPLE** Find the x -intercept and y -intercept of the equation $y = -2x + 8$.

We can easily find the y -intercept:

$y = -2x + 8$ When we have the equation in the form $y = mx + b$, the variable b is the y -coordinate of the y -intercept

$b = 8$ This is the y -coordinate of the y -intercept. For the y -intercept, the x -coordinate is always 0

y -intercept = (0, 8) The y -intercept is (0, 8)

Now, find the x -intercept:

$y = -2x + 8$ To find the x -intercept, plug 0 in for y as the y -coordinate is always 0

$0 = -2x + 8$ Subtract 8 from both sides

$$-8 = -2x \quad \text{Divide both sides by -2}$$

$$4 = x \quad \text{This is the x-coordinate of the x-intercept. For the x-intercept, the y-coordinate is always 0}$$

$$x\text{-intercept} = (4, 0) \quad \text{The x-intercept is (4,0)}$$

For the equation $y = -2x + 8$, the x-intercept is at (4,0) and the y-intercept is at (0,8).



SUMMARY

When **determining intercepts on a graph**, the x-intercept is where a line or a curve intersects the x-axis. It is also where y equals 0 and is written as $(x, 0)$ as a coordinate pair. The y-intercept is where a line or curve intersects the y-axis. It is also where x equals 0 and is written as $(0, y)$ as a coordinate pair. When **determining intercepts from a table**, we look for instances where x equals 0 or y equals 0. When **determining intercepts from an equation**, the variable b represents the y-coordinate of the y-intercept. To find the x-intercept, plug in 0 for y and solve for x .

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TERMS TO KNOW

x-intercept

The location on a graph where a line or curve intersects the x-axis: $(x, 0)$

y-intercept

The location on a graph where a line or curve intersects the y-axis: $(0, y)$